Progress Report

1. Introduction
   1. Background: Medical Image Analysis with Deep Learning
   2. Objectives
   3. Applications
   4. Report Outline
2. Related Work
   1. Medical Image Analysis
      1. …
      2. …
      3. …
   2. Deep Learning for Computer Vision
      1. Neural Network

FC

Activation

Multi-class and Multi-label Classification

* + 1. Convolutional Neural Network

CNN Architecture

* + - * 1. Convolutional Layer
        2. Pooling Layer

CNN Models

* + - * 1. AlexNet
        2. VGG
        3. ResNet
        4. EfficientNet
    1. Model Training and Optimization:

Model Training with Back Propagation

Optimization Algorithms

* + - * 1. GD
        2. SGD
        3. Adam

Learning Rate Scheduling

* + - * 1. …
        2. OneCycleLR (1 epoch)
    1. Transfer Learning
    2. Multimodal Learning
    3. Multi-task Learning

1. Methodology
   1. Datasets (EDA)
      1. train\_images/StudyInstanceUID/slice\_index.dcm

(important metadata: slice #, slice thickness, x, y, z)

* + 1. train.csv (StudyInstanceUID, patient\_overall, C1~C7)
    2. segmentations/StudyInstanceUID.nii
    3. train\_bounding\_boxes.csv (StudyInstanceUID, slice\_index, x, y, width, height)
  1. Evaluation Metrics
  2. Project Workflow
     1. Data Preprocessing

Image Augmentation

Image Masking and Segmentation

* + 1. Vertebrae Detection
    2. Fracture Detection
    3. Fracture Localization
    4. Cervical Spine Visualization

1. Current Experiment Result
   1. Experiment Setup
   2. Model Prediction Accuracy
2. Discussion
   1. Difficulties
   2. Limitations
   3. Future Work
      1. Image Preprocessing
      2. Model Optimization

FC, lr scheduler param, etc.

* + 1. Fracture Detection
    2. Fracture Detection with 3D CNN
    3. Fracture Localization
    4. Result Visualization

1. Conclusion